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SUGGESTED METHOD IN MEASURING AND CALCULATING THE ACREAGE OF FIELDS UNDER TOBACCO, COTTON AND CORN-HOG CONTRACTS.

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The areas of fields will be obtained from measurements of the sides and diagonals of the actual crop areas excluding uncultivated areas along fences or roads or within the crop bounds. The supervisor, assisted by the producer or his representative, will make the field measurements. In the case of cultivated crops, one half the width of a row is the distance allowed around the edge of the field. The supervisor will make a sketch of each field measured showing the shape and location of the field and will record on this sketch the measurements made. He will then make the necessary acreage computations and record his results on the compliance forms. These forms, together with all field notes and sketches, will be submitted to the County Office where acreage computations will be checked for method and accuracy. The data must be recorded accurately so that figures may be rechecked. The same unit of measurement should be used by all supervisors in each county for purposes of calculation to facilitate checking in the county office.

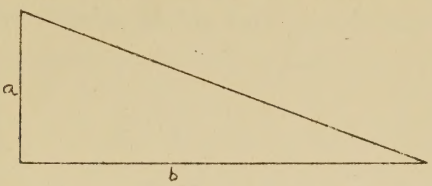
The equipment necessary consists of one surveyor's chain and eleven chaining pins or one steel tape one hundred feet in length and eleven chaining pins. A surveyor's chain is sixty-six feet in length with one hundred divisions called links. Chain measure is especially convenient for land measurement because ten square chains equal one acre.

Tape measurements should be made with the zero end of the tape ahead and the tape extended to full length on the ground. The marking pins are used by the head tape man to mark the tape lengths as they are measured and are collected by the rear tape man as a temporary record of the tape lengths measured. The rear tape man starts with one pin at the starting point which "counts" the first tape length measured. The rear tape man can always tell the number of tape lengths measured up to ten by counting the number of pins in his hand. When he has collected ten pins, the eleventh pin marks the tenth tape distance from the starting point. Pattial tape lengths at the ends of lines are read by the rear tape man, the zero end of the tape being held at the corner marking pin by the head tape man.

The measurement of a field by chaining or taping the sides and diagonals and without measuring the enclosed angles of the field requires that the field be "sized up" before beginning measurements. This method is not applicable to a field which is so large or so irregular that the supervisor is unable to see across the field from one corner to another. In using this method, the first step is to observe the shape of the field and determine what measurements are necessary for the calculation of the area. Where the crop is planted in rows, it is usually easy to determine whether or not the sides of the field are parallel. If they are, the measurements necessary to compute the area are easily made. If no sides are parallel it is often possible to divide the field into two or more portions, one having a regular shape and the others consisting of irregular or triangular portions along the boundary. Cases representing various field shapes are diagrammed below and the measurements necessary to compute the area are indicated.

I. Fields with three sides (triangles)

(a) Right angle triangles (one square corner)

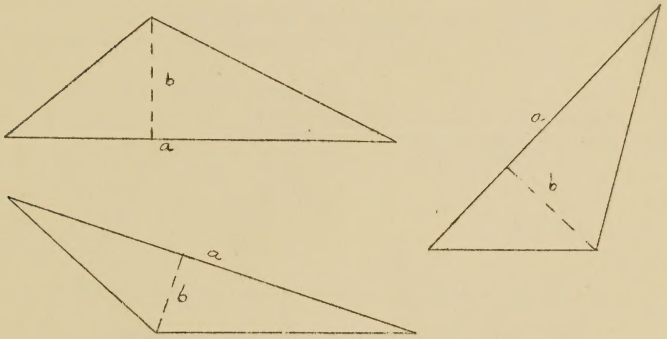


Measure the two sides which form the right angle (a and b)

Area = a times b, divided by 2

$$\left(\frac{a \times b}{2} \right)$$

(b) Other triangles



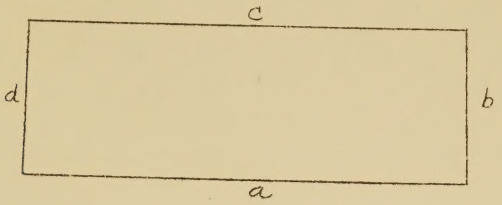
Measure the longest side (a) and the shortest (perpendicular) distance (b) from that side to the opposite corner.

Area = a times b divided by 2

$$\left(\frac{a \times b}{2} \right)$$

II. Fields with four sides

(a) Rectangular fields (all corners apparently right angles)



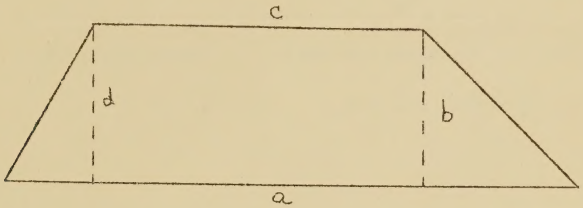
Measure each side of the field

Area = average of a and c times average of b and d

$$\left(\frac{a+c}{2} \times \frac{b+d}{2}\right)$$

The average of two apparently parallel sides is taken to reduce error in measurement.

(b) Two sides parallel

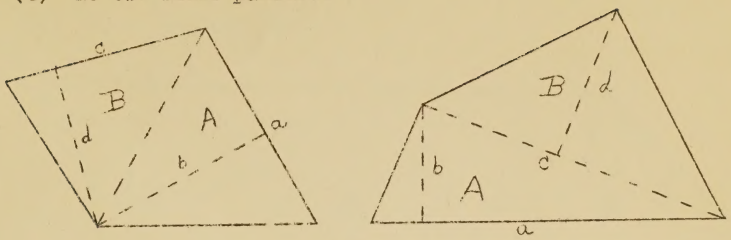


Measure each parallel side and the shortest (perpendicular) distance between them making the perpendicular measurements near the ends of the parallel sides.

Area = average of a and c times average of b and d

$$\left(\frac{a+c}{2} \times \frac{b+d}{2}\right)$$

(c) No two sides parallel



Consider the field as two triangles, A and B, and measure the base and height of each triangle.

Area of triangle A = a times b, divided by 2

$$\left(\frac{a \times b}{2} \right)$$

Area of triangle B = c times d, divided by 2

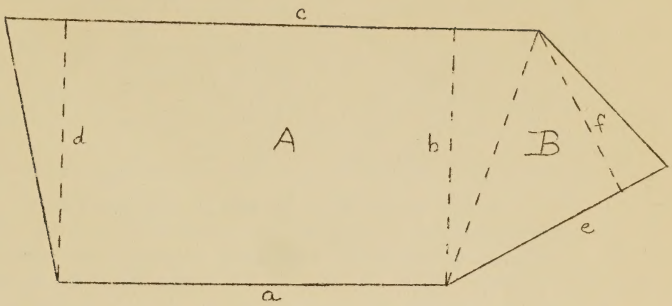
$$\left(\frac{c \times d}{2} \right)$$

Area of field = sum of areas of two triangles

$$\left(\frac{a \times b}{2} + \frac{c \times d}{2} \right)$$

III Fields with five sides

(a) Two sides parallel



Consider the field as a four sided field with two sides parallel, (A), plus a triangular field (B).

Measure the two parallel sides (a and c) and the perpendicular distance between them (at two points, b and d).

Measure the base and the height of the triangle.

Area of part A = average of a and c times average of b and d.

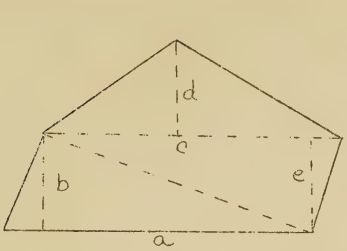
$$\left(\frac{a + c}{2} \times \frac{b + d}{2} \right)$$

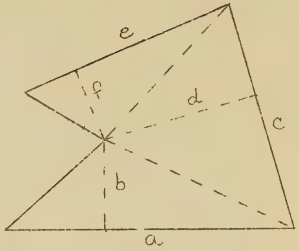
Area of part B = e times f, divided by 2

$$\left(\frac{e \times f}{2} \right)$$

Area of field = area of Part A plus area of Part B

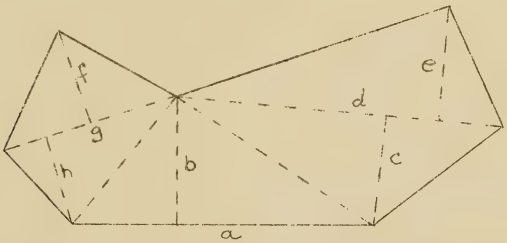
(b) No two sides parallel





Consider the field as made up of three triangles. Measure the base and height of each triangle. Calculate the area of each triangle (base times height, divided by 2) and add areas of triangles to get total area of field.

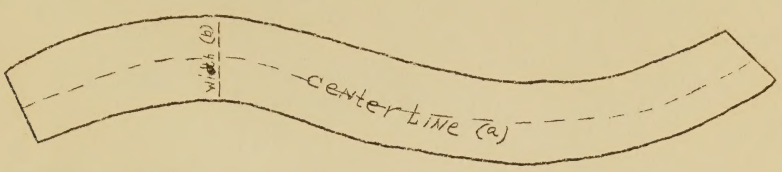
IV. Fields with more than five sides.



Divide the field into triangles and measure the base and height of each triangle. Calculate the area as in case III (b).

V. Irregular fields or parts of fields.

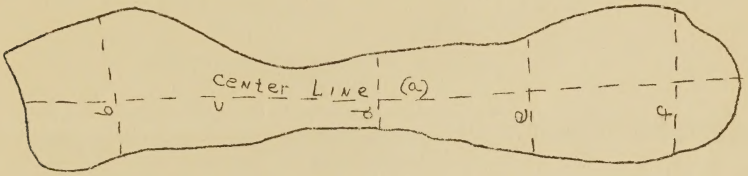
(a) Strips of uniform width such as a given number of rows of a crop planted so as to follow a contour line, stream, etc.



Measure the length of the strip along the center line and the width of the strip. The width is measured at right angles to the center line.

Area = length times width(a x b)

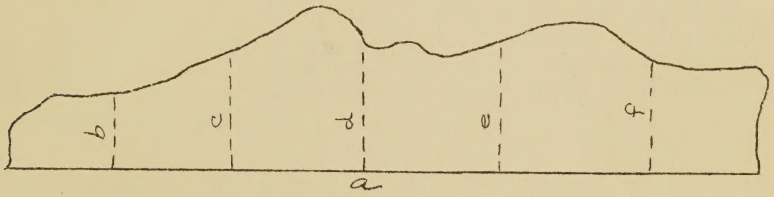
(b) Strips of varying width



Measure the length of the strip along the center line and find the average width by measuring the width (at right angles to the center line) at a sufficient number of places to get a fair average.

Area = length times average width $\left(a \times \frac{b+c+d+e+f}{5}\right)$

(c) Irregular fields with one straight side or irregular borders of a field.



Measure the length of the field (or border) along the straight side and find its average width as in case V(b) above.

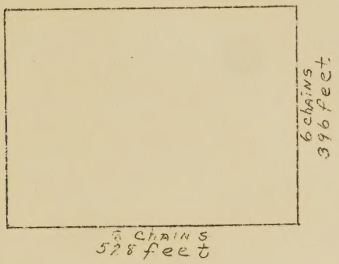
Area = length times average width $\left(a \times \frac{b+c+d+e+f}{5}\right)$

Units of Measure:

1 chain = 66 feet

1 acre = 10 square chains
= 43,560 square feet

Example (rectangular field):



Area = 8 x 6 = 48 square chains
= $\frac{48}{10}$ = 4.8 acres

or 528 x 396 = 209,088 square feet
= $\frac{209,088}{43,560}$ = 4.8 acres

The methods outlined in W-42, "The Measurement of Fields Under Production Control Contracts", and in W-43, "The Computation of Acreage Under Production Control Contracts", will be approved for use in States or counties where desired. This method is recommended where crops may be injured by taking diagonal measurements. In counties where it is not essential or desirable that plane tables be used generally as outlined in W-42 and W-43, one or more men should be equipped with plane tables. These men would measure large fields or difficult cases where angle measurements are required.